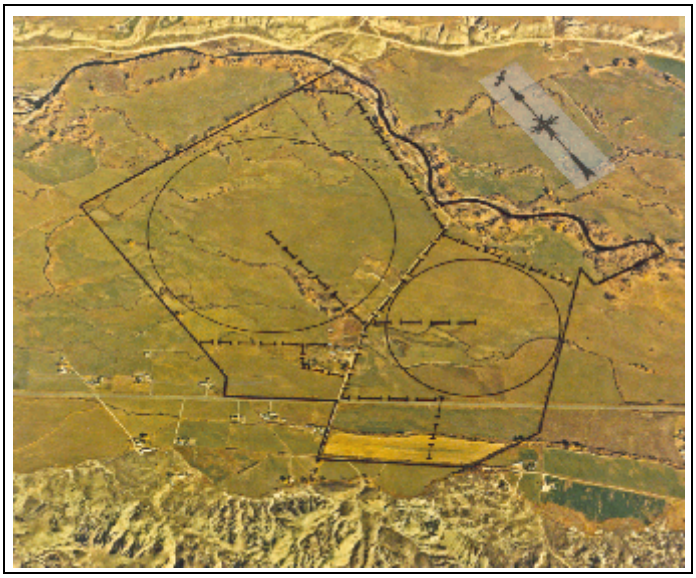
PARTNERSHIPS IN WATER CONSERVATION

SEPTEMBER 1997 WATERSHED CONSERVATION DEMONSTRATION PROGRAM LEMHI RIVER, IDAHO

Lemhi River Flood Irrigation Converted to Sprinkler System

Partnership

The Bureau of Reclamation was asked by the Northwest Power Planning Council in 1991 to lead a cooperative effort with irrigators, Federal, and state agencies. Irrigation water conservation demonstration projects in four areas of the Columbia River drainage were selected and designed. The projects are to "...test the physical, economic, environmental, and institutional viability of water conservation for improving instream flows and water quality in critical salmon production areas."



Two center-pivot sprinklers and wheel line systems now irrigate approximately 385 acres that were previously served by the L-4 diversion. *(Reclamation; 1995)*

Major criteria for selecting the Lemhi River basin as the Idaho project area were general support by water users and a lack of public opposition. A local oversight committee included citizens representing the Lemhi (County) Soil and Water Conservation District, the High County Resource Conservation and Development Council, Natural Resources Conservation Service, Idaho Water District 74, Lemhi Irrigation District, the Lemhi County advisory committee to the local Farm Service Agency, Lemhi County Agricultural Extension, the Shoshone-Bannock Tribes of the Fort Hall Reservation of Idaho, National Marine Fisheries Service, U.S. Fish and Wildlife Service, the Columbia Basin Fish and Wildlife Authority, Idaho Department of Water Resources, and the Idaho Department of Fish and Game. A technical committee of specialists from some of these agencies was also established to support the oversight group. Reclamation, with contributions from other State and Federal agencies, provided the committee with planning, design services, and environmental compliance activities.

Problem

The Lemhi River is a tributary of Idaho's upper Salmon River, is located near the Montana border, and has historically produced nearly 20 percent of all the "redds" (fish nests) counted in the upper Salmon basin. Counts of spring chinook salmon redds decreased from more than 1,720 in 1961 to 20 in 1994. The National Marine Fisheries Service listed the Snake River sockeye salmon as endangered under the Endangered Species Act in December 1991. The Snake River spring/summer and fall chinook salmon were listed as threatened in April 1992 and reclassified as endangered in August 1994 under an interim emergency rule.

A 3-mile-long reach of the Lemhi River where the L-4 diversion structure was located had been identified as a barrier to passage of salmon and provided no means of regulating flows. A combination of seasonal low flows and irrigation diversions caused the river to dry up in several reaches. Periods of scarcity normally occurred prior to the spring runoff and after late summer runoff. Even when water was available within the 3-mile reach, it was difficult for smolt and adult salmon and steelhead to negotiate. Historically when "excess flows" (flows beyond downstream water rights which occur during wet periods of spring and summer) were available, generally during May and June, diversions were a hindrance to migration.

High flows in the Lemhi River damaged the gravel diversion dams requiring reconstruction each spring and occasionally in the summer. Each time the diversions were rebuilt, there was potential for sediment to cover the redds and hinder development of the eggs. Existing fish screens on the canals did not meet current criteria. Increased flows and regulation of irrigation diversions would accommodate flushing flows during critical migration periods.

Lemhi River Water Conservation Demonstration Project

The initial intention for the Lemhi River Water Conservation Demonstration Project was to replace five gravel push-up dams with permanent diversion structures in a critical 3-mile reach and to increase the streamflow at critical fish migration times. The new structures would provide for regulation of flows with "Obermeyer gates," steel plates raised and lowered by inflatable bladders. As planning progressed, an additional diversion was included and new options identified. One new option that evolved was complete elimination of the L-4 diversion by providing an alternate diversion point and a different method of irrigation for the sole landowner served by the L-4 diversion. Two permanent structures have been constructed, and three existing structures have been eliminated.

To improve streamflows at critical times, the committee chose "fish flushes" during which irrigators would voluntarily let 20 percent of their decreed irrigation water flow past the diversions for 12-hour periods critical to spawning. Flushes provide an attraction flow to encourage adult fish to migrate upstream and help move juveniles downstream.

Reclamation prepared a Categorical Exclusion Checklist and an Environmental Report which were distributed for public comment. The biological opinion concluded that the project would not jeopardize the listed salmon stocks.

Plan for Diversion L-4

The original design for the L-4 site included fish facilities and a diversion structure estimated at about $730,000 for 30 cubic feet per second (cfs). As an option, the landowner proposed the elimination of the L-4 diversion and conversion to a sprinkler system to supply approximately 385 acres of the L-4 diversion lands. The original design costs were considered excessive, so the sprinkler system proposal was developed. Water rights for 6 cfs were transferred upstream to the L-6 diversion and are pumped from the L-6 canal into a center-pivot sprinkler system. Lands that cannot be served by the center-pivot are served by hand-moved sprinkler laterals. This change in design resulted in the retention of 24 cfs in the Lemhi River to benefit fish migration and a savings of nearly $230,000. The conversion will save about 1,000 acre-feet of water in an average water year. The sprinkler system was designed and built by the Natural Resources Conservation Service.

Project

An agreement between the landowner and Reclamation provided for removal of the L-4 diversion and precluded any future diversions other than the legal water right transferred to diversion L-6. Removal of the L-4 diversion eliminates the delay to fish migration through this reach of the river and prevents disturbance to the streambed caused by annual construction and maintenance activities. It also eliminates the diversion of excess flows for the L-4 lands. During nonregulated periods of the irrigation season, up to an additional 24 cfs of water will be left in the Lemhi River. The landowner provides for operation, maintenance, and pays for the power costs of the sprinkler system.

Disturbance to wildlife habitat was held to a minimum for construction of the center-pivot sprinkler.

Implementation Issues of Concern

The L-4 gravel push-up diversion dam and canal on the Lemhi River have since been abandoned. *(Reclamation; 1992)*

Sprinkler irrigation of the L-4 lands is accomplished in such a manner as to minimize any impacts to the water supply for diversion L-3A lands downstream.

Construction of the sprinkler system resulted in the loss of about 5 acres of riparian wildlife habitat, mostly willows and a few cottonwoods; however, the demonstration project as a whole will have a substantial and positive effect on wildlife habitat and wildlife in the project area.

Benefits

The conversion from flood irrigation to sprinkler irrigation provides many positive benefits:

- elimination of one diversion point on the Lemhi River
- improved control of flow from the Lemhi River to irrigated lands
- implementation of water conservation efforts
- elimination of repairs to the gravel diversion dams after high flows
- elimination of short-term decreases in water quality from frequent reconstruction of gravel push-up diversion dams
- improved passage of salmon and steelhead through improved water management
- lands irrigated by the sprinkler system have the potential for increased production

Monitoring

Fish migration is being monitored within the 3-mile reach by the Idaho Department of Fish and Game and the Shoshone-Bannock Tribes of the Fort Hall Reservation of Idaho. Idaho Water District 74 is monitoring diversions from the Lemhi River. Reclamation is monitoring the overall effectiveness of the project.

The Lemhi River L-4 gravel push-up diversion dam has been permanently removed and the canal intake has been blocked. *(Reclamation; 1996)*

Cost

Reclamation signed a Memorandum of Agreement with the Natural Resources Conservation Service to provide designs and specifications for the sprinkler system. After completion of this work, Reclamation extended the Memorandum of Agreement to include contract administration and construction oversight. The $500,000 budget for the sprinkler system included $50,000 for designs, $388,000 for construction, and $62,000 for contract administration.

Other information sheets in the series about the Lemhi River Water Conservation Demonstration Project include the *Lemhi River Diversion Point Relocation* and the *Lemhi River L-6 and L-7/7A Diversion Improvements.*

For further information on these, on the *Lemhi River Flood Irrigation Converted to Sprinkler System,* or on the water conservation demonstration project, contact:

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